

ON A COLLECTION OF
REPTILES AND BATRACHIANS
 FROM WESTERN AUSTRALIA

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PLATES XXVII-XXVIII. AND TEXT FIGURES I-II.

In continuation of the arrangement with Mr. Bernard H. Woodward, Director of the Western Australian Museum, Perth, the Trustees have received a large collection of Reptiles and Batrachians from that State for identification. The present paper forms a report on those species contained which are of special interest, some being regarded as new, whilst others are re-described or recorded from Western Australia for the first time.

LACERTILIA (LIZARDS).

- Diplodactylus woodwardi*, sp. nov.
 „ *lucasi*, nom. nov.
Peropus variegata, var. *punctata*, var. nov.
Ophioseps repens, sp. nov.
Amphibolurus scutulatus, Stirling and Zietz.
Egernia formosa, sp. nov.
Lygosoma (Rhodona) picturatum, sp. nov.
Cryptoblepharus rhodonoides, L. & F.

OPHIDIA (SNAKES).

- Liasis olivaceus*, Gray?
Demansia psammophis, var. *reticulata*, Gray.
 „ *modesta*, Günther.
 „ *affinis*, Günther.
 „ *nuchalis*, Günther.
Pseudechis australis, Gray.
Furina bimaculata, D. & B.

BATRACHIA (FROGS AND TOADS).

- Limnodynastes ornatus*, Gray.
 „ *dorsalis*, Gray, var. *typica*.
Crinia georgiana, Bibr., var. *stolata*, Cope.
 „ *leai*, Fletcher.
Phractops australis, Gray.
Helioporus albopunctatus, Gray.
Myobatrachus gouldii, Gray.
Hyla caerulea, White.
 „ *rubella*, Gray.
 „ *adelaidensis*, Gray.
 „ *latopalmata*, Günther.
 „ *nasuta*, Gray.

I wish to express my thanks to Mr. Woodward for his kindness in allowing me to examine this collection, and for undertaking the publication of my report.

LACERTILIA

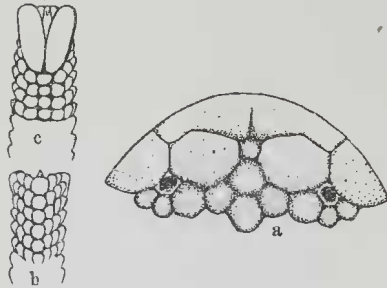
(LIZARDS).

DIPLODACTYLUS WOODWARDI, Sp. nov.

PLATE XXVII., FIG. I. AND TEXT FIG. I.

Head elongate oviform, very convex, three-fourths as broad as long (the length of the head is measured from the tip of the snout to the ear opening). Snout rounded, one-third longer than the orbital diameter, as long as the distance between the eye and the ear orifice. Ear opening hardly distinguishable, very minute. Loreal region grooved; forehead not grooved. Rostral twice as broad as high, highest in the middle line where it is nicked; a small groove above, extending on the upper third of the rostral. Nostril situated between the first upper labial, a supranasal, and three small postnasals; supranasals separated from one another by two enlarged hexagonal granules; postnasal granules not enlarged; granules bordering supranasals enlarged, hexagonal. The posterior border of the upper eyelid (seen under a lens) bears six to seven small,

soft conical spines. Labials $\frac{11}{11}$, anterior largest. Mental longer than broad, broader in front than behind, slightly longer than the adjoining labials. Angle of the mouth slightly in front of the hinder border of the eye. A small fold from below the eye to



TEXT FIG. 1.—*Diplodactylus woodwardi*, sp. nov. (from type).

- a. Dorsal view of tip of snout, enlarged.
- b. Dorsal view of tip of fourth toe, enlarged.
- c. Ventral view of tip of fourth toe, enlarged.

behind the angle of the mouth ; another, possibly due to preservation, above the ear opening. Scales of head granular, very convex, uniform, those near the labials enlarged. Scales of back like those of the head, slightly larger than those of the sides. Belly scales flatter than dorsal scales, with a tendency, like those of the sides, to overlap. Scales of limbs uniform. Scales of tail squarish, larger than body scales, arranged in transverse rows. Digits cylindrical, not depressed at tips ; inferiorly with transversely oval granules ; two enlarged, elongate, slightly diverging plates at the apex.

Colour (Spirits):—Back light brownish, with eight or nine alternating darker brown bands consisting of a network enclosing occasional white spots. Large white spots on the sides between the bands. A band of reticulations on the loreal region and behind the eyes, connecting with its fellow in the occipital region. Upper surface of limbs with faint reticulations. Tail with alternating brown bands dorsally connected with each other laterally. Under surfaces uniform creamish.

Total length (from tip of snout to tip of tail) 51 mm.

This handsome species is allied to *D. alboguttatus*, Werner,¹

¹ Werner.—Fauna Südwest-Austr., II, 1910, p. 462, fig. 4.

recently described from Denham on the Peron Peninsula, Shark Bay. The following short definition will distinguish the two species.

D. alboguttatus, Werner.

Snout a little longer than the distance of the eye from the ear opening. Ear opening obliquely elliptical. Rostral almost twice as broad as high, rectangular. Mental not longer than the adjoining labials. Nasal opening in contact with the rostral, one upper labial and four nasals, the upper (supranasals) in contact mesially.

D. woodwardi, sp. nov.

Snout as long as the distance between the eye and the ear opening. Ear very minute. Rostral twice as broad as high, roughly pentangular, nicked above. Mental slightly longer than the adjoining labials. Nasal opening not in contact with the rostral, and the supranasals are separate mesially by two hexagonal enlarged granules.

There are also colour differences which, however, are better shown by a comparison of the two figures.

Locality.—I have examined only a single young example from Western Australia.

Type.—In the W.A. Museum.

DIPLODACTYLUS LUCASI, nom. nov.

Diplodactylus bilineatus, Lucas and Frost, Proc. Roy. Soc. Vict., Ser. 2, XV., 1903, p. 146 (not *Diplodactylus bilineatus*, Gray, Cat. Liz. Brit. Mus., 1st ed., 1845, p. 149, and Zool. Erebus & Terror, Reptiles, pl. XV, fig. 3.)

The name *Diplodactylus bilineatus*, Lucas and Frost, is antedated by the same name proposed by Dr. J. E. Gray for a Gecko which Dr. Boulenger now regards as synonymous with *Phyllodactylus ocellatus*, Gray. As it becomes necessary to propose a new name for Messrs. Lucas and Frost's species, I have much pleasure in associating the name of Mr. A. H. S. Lucas with it.

It is worthy of remark that *Diplodactylus michaelsoni*, described and figured by Dr. Werner¹, bears a general resemblance to Dr. Gray's figure of *Diplodactylus bilineatus*, but differs materially in structural characters.

¹ Werner—Fauna Südwest-Austr., II, 1910, p. 460, fig. 4.

Diplodactylus michaelsoni, Werner, was described from Denham, while Messrs. Lucas and Frost's type of *D. bilineatus* came from Carnarvon. The type specimen of Dr. Gray's *D. bilineatus* (*Phyllodactylus ocellatus*, Gray, *vide* Boulenger¹) was described from Houtman Abrolhos, and recorded by Dr. Günther² from Champion Bay, and by Dr. Werner³ from Boorabbin, Coolgardie Goldfield.

PEROPUS VARIEGATUS, Dum. and Bibr., var.
PUNCTATUS, var. nov.

Gehyra variegata, Gray, Lucas and Frost, Rep. "Horn" Sci. Exped. Centr. Austr., II, 1896, p. 124, pl. IX, fig. 3 (part only).
? *Gehyra variegata*, Gray, Werner, Fauna Südwest-Austr., II, 1910, p. 467 (part only).

In the collection is a single female example of this widely distributed species from the Strelley River, Pilbara. It presents the colour variety noted and figured by Messrs Lucas and Frost. In all structural characters it agrees with the variable *P. variegatus*, but the colour pattern is so different that I propose to distinguish it under the varietal name of *punctatus*. The following short diagnosis will serve to define this form.

Upper surfaces russet brown, lighter on the snout, with transverse rows of silvery and yellowish spots. The spots are more abundant on the limbs. Black spots may be distributed all over the dorsal surface or they may be confined to two rows, one each side of the vertebral column, between the rows of lighter spots. Sometimes two faint streaks of brown on the loreal region, the upper continuing behind the eye to above the ear opening.

OPHIOSEPS REPENS, sp. nov.

TEXT FIGURES 2 AND 3.

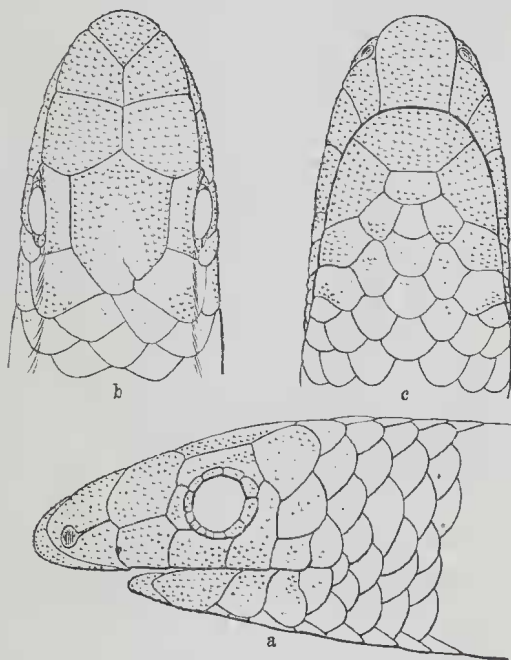
Snout projecting, slightly hooked and trilobed; a little more than three times the diameter of the eye. Eye considerably longer than its distance from the mouth, surrounded by a ring of small scales, of which the posterior are the largest. Portion of the rostral seen from above is once and one half as long as its distance from the frontal, once and a quarter as broad as long, as long as the

¹ Boulenger—Brit. Mus. Cat. Liz., 2nd ed., I, 1885, p. 93.

² Günther—Ann. Mag. Nat. Hist., Ser. 3, XX, 1867, p. 49.

³ Werner—*loc. cit.* p. 456.

diameter of the eye; the portion seen from below longer than broad and slightly narrower behind than in front. Nasals apparently fused with the first supralabial of each side, in contact behind the rostral; a little shorter than the praefrontals, their suture being the

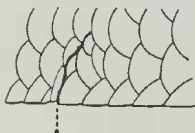


TEXT FIG. 2.—*Ophioseps repens*, sp. nov. From type.

- a. Side of head, enlarged.
- b. Dorsal view of head, enlarged.
- c. Ventral view of head, enlarged.

same length as that of the praefrontals. Nostril large, not visible from above; a very distinct groove runs from its posterior edge to the lower anterior border of the praefrontal. Praefrontals a little larger than the nasals, a little more than half the length of the frontal, forming a suture in the median line and with the first supralabial (the second supralabial if we count the first as fused with the nasal). Frontal six-sided; broader in front than behind; almost once and a half as long as broad, as long as its distance from the end of the snout. Supraocular narrow, extending down behind the eye and meeting the third supralabial. A pair of parietal shields larger than the adjoining scales, in contact behind the eye with the third supralabial. A small praeocular; no postocular.

Four supralabials distinct; the third very high and bandlike, in contact behind the eye with the supraocular and the parietal scale, the fourth smallest, squarish. Mental large, nearly twice as broad as long. Four sublabials, the anterior pair the largest and separated from each other in the median line by a small shield which is followed by three others, the middle one of which is the smallest. Headshields thickly dotted with minute papillae. Scales smooth,



TEXT FIG. 3.—*Ophioseps repens*, sp. nov. From type.
Lateral view of anal cleft.

Typhlops-like, in twelve series round the body. Praeanals not enlarged. No external rudiments of limbs. Tail one third as long as the body, terminating in a circular scale.

Colour (Spirits):—Body light greyish brown above, slightly lighter beneath. Longitudinal rows of faint spots on the dorsal and lateral scales, these spots fainter and the rows more numerous on the sides. Headshields with faint brown marks. Tail yellowish, the rows of spots of a reddish colour.

Total length 145 mm., Tail 45 mm.

This new species is distinguished from *O. nasuta*, Bocage, mainly by the longer snout, which is hooked in profile; the much larger nostril and the presence of a very distinct groove which connects with the praefrontal, not with the first supralabial; the different proportions and shapes of the headshields, which in *O. repens* are covered with minute papillae, and the smaller number of scales round the body. The two species are here compared side by side.

<i>Ophioseps repens.</i>	<i>Ophioseps nasutus.</i>
1. Snout slightly hooked and trilobed : more than three times the diameter of the eye.	1. Snout not hooked, broadly rounded. Two and one half times the diameter of the eye.
2. Portion of the rostral visible from below longer than broad.	2. Portion of the rostral visible from below broader than long.
3. Nostril large, the groove connecting it with the praefrontal.	3. Nostril small, the groove, when present, connecting it with the first supralabial.
4. Praefrontals and nasals seen from above longer than broad.	4. Praefrontals and nasals seen from above much broader than long.
5. Frontal broader in front than behind, just as long as its distance from the tip of the snout.	5. Frontal broader behind than in front, more than twice as long as its distance from the tip of the snout.
6. Supraocular in contact with the third supralabial behind the eye.	6. Supraocular separated from the third supralabial by a postocular or several small scales.
7. Headshields with minute papillae.	7. Headshields quite smooth.
8. Scales in twelve series round the body.	8. Scales in fourteen series round the body.

Dr. Werner shows¹ that there is considerable variation in *O. nasuta*. In his *Aprasia brevirostris*² which he has later shown³ to be synonymous with *O. nasuta*, the small scales which surround the eye are fused into a narrow band, and the portion of the rostral seen from above is sometimes half as long as its distance from the frontal while Jensen's figure⁴ of *O. nasuta*, shows it to be almost as long as its distance from the frontal. The nasal cleft may be present or absent. In Jensen's specimens and in Du Bocage's type⁵ there is a postocular, while in Dr. Werner's types of *A. brevirostris* there are two small undifferentiated scales behind the eye. The praeanalals may or may not be enlarged.

This remarkable variation within the one species is only in keeping with the extraordinary individual variation of other members of the family Pygopodidae, to which family Dr. Werner has referred this genus. The above proposed new series however,

¹ Werner—Das Tierreich, Lief 33, 1912, p. 26.

² Werner—Fauna Südwest-Austr. II, 1909, p. 266, figs.

³ Werner—Das Tierreich, Lief 33, 1912, p. 26.

⁴ Jensen—Vid. Meddel., 1899, p. 317, pl. iii.

⁵ Bocage—Journ. Sc. Lisb., IV, 1873, p. 321.

differs too much to be considered a degree in variation of the type species, and in some respects is close to *Aprasia pulchella*, Gray.

Locality.—A single specimen from W.A. without exact locality is in the collection.

Type.—In the W.A. Museum.

AMPHIBOLURUS SCUTULATUS, Stirl. & Zietz.

Amphibolurus scutulatus, Stirling & Zietz, Trans. Roy. Soc. S. Austr., XVI., 1893 p. 165, pl. VII., figs. 1 and 2.

Snout almost twice as long as the diameter of the eye opening, with projecting canthus rostralis and very concave lores. Nostril slightly nearer the eye than the tip of the snout, directed upwards and backwards, pierced in an enlarged nasal situated below the angle of the canthus rostralis. Rostral small, broader than long, roughly hexagonal. Tympanum large, vertically elliptic but slanting slightly forwards, its vertical diameter equal to that of the eye opening. Upper head scales sub-equal, smallest on the supra-orbital region, mostly tricarinate, the keels meeting at the posterior extremity of each scale. A superciliary ridge with elongate unicarinate scales. Scales much smaller on the temporal region. Scales bordering the upper lip, regular, not enlarged. A ridge of enlarged scales runs from beneath the eye to above the tympanum. Several small folds of skin on the neck bearing groups of small conical spines. Gular scales small, flat, sometimes faintly keeled, enlarged and hexagonal towards the lower labials. Mental longer than broad, slightly larger than the rostral. Scales of the upper surfaces strongly keeled, very slightly enlarged towards the vertebral region. A very distinct nuchal crest continuous behind with a vertebral series of slightly enlarged scales, or a distinct dorsal crest. Scales of limbs larger than body scales. Ventral scales keeled, larger than dorsal scales. Fore limb moderate; hind limb long, the toes of the adpressed limb reaching to the eye or the loreal region; the length of the foot equals that of the fore limb. The male with fifty to fifty-three praeanal and femoral pores forming an uninterrupted series on each side. Tail depressed at the base, with a serrated ridge not distinguishable on the posterior third of its length.

Colour (Spirits):—Upper surface of head rusty brown with black spots on the keels of the scales. Sides of head lighter, shading to yellow, sometimes with several fine black temporal streaks. A single median series of large black spots on the neck and anterior part of the back, breaking up into a double series of dorso-lateral spots towards the posterior part of the body. These spots sometimes enclose (towards the posterior part of the body) a light area of yellowish or brownish with a variegated centre. External to this series of spots is a light reddish, dark-edged band of lozenge-shaped spots, or a series of definite dark-centred light-edged ocelli. A series of about six narrow, light ashy-grey transverse bars cross the back, dividing the ocelli or separating the lozenge-shaped spots. Sides yellowish, reticulated with greyish or black. Tail sometimes with a distinct lateral band of lozenge-shaped spots and a light dorsal band, or variegated brownish. Numerous light ashy-grey bands cross the tail, completely dividing the dark lateral band. Under surfaces uniform yellowish, or more or less densely clouded with black on the throat, chest and abdomen. Limbs reddish-brown with yellow lines enclosing more or less regular shaped spots. Under surfaces sometimes clouded with black. Feet and hands rusty-red.

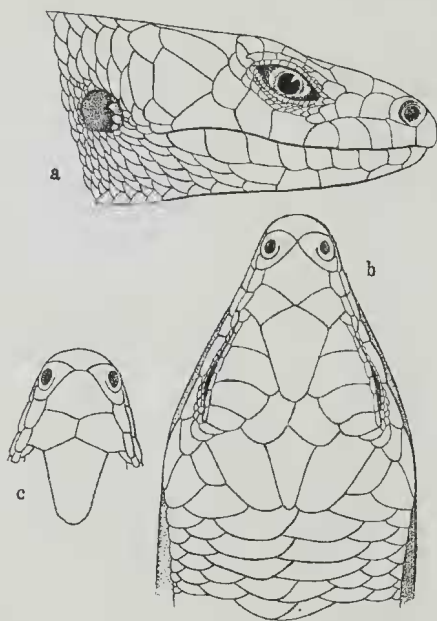
The affinities of this lizard are with *A. cristatus*, Gray, and the differences have been summed up by Messrs. Stirling and Zietz as follows:—"All the scales are much smaller, the head scales not rugose as in *A. cristatus*, but smooth and strongly keeled. The dorsal scales are not intermixed with larger ones, but increase in size towards the vertebral line. The compressed spines of the nuchal crest are shorter." To these might be added the marked difference in colour marking. Recorded from between Fraser Range and Queen Victoria Springs.

Localities.—A single adult female from Mt. Malcolm is in the collection. I have also examined a specimen presented to the Australian Museum by Mr. A. H. S. Lucas, from Kalgoorlie. Both these and the original description have been utilised in the preparation of the above description.

EGERNIA FORMOSA, sp. nov.

PLATE XXVII, FIG. 2 AND TEXT FIG. 4.

Head rather broad. Head shields smooth. Rostral once and a half as high as broad, pentagonal, forming an arcuate suture with each nasal. Nasals slightly swollen, separated or just in contact with the rostral. A curved groove behind the nostril. Frontonasal slightly broader than long. Praefrontals moderate, forming a short median suture or just separated by the frontal. Frontal once and a third to once and a half as broad as long, separated from, or narrowly in contact with, the frontonasal; in contact with the first and second supraoculars. Four supraoculars, second largest; six to eight supraciliaries. A group of imbricate prae- and postoculars. Frontoparietals forming a median suture; in contact with the second, third and fourth supraoculars. Interparietal almost twice as long as broad, as long as or longer than the frontal. Parietals separated by the interparietal. Three pairs of enlarged nuchals

TEXT FIG. 4.—*Egernia formosa*, sp. nov.

- a. Side view of head, enlarged.
 b. Dorsal view of head, enlarged.
 c. Tip of snout of a specimen showing variation in shields

normally. Labials $\frac{7}{7}$ or $\frac{7}{8}$, the seventh upper and the seventh lower largest, the fifth and sixth below the orbit. Three enlarged temporals. Ear opening oval, with two to four projecting lobules anteriorly, its vertical diameter almost as long as the eye opening. Twenty-eight smooth or feebly straited scales round the body, those on the vertebral line slightly enlarged, those on the sides smallest. Praeanals not or but feebly enlarged. Limbs moderate; when adpressed they just meet or slightly overlap. Toes slender, compressed; eighteen to twenty lamellae under the fourth. Tail cylindrical or very slightly depressed at the base, a little longer than the head and body; no series of transverse scales dorsally except in reproduced portions.

Colour (Spirits):—Dark or yellowish olive above. Head shields with irregular dark brown markings. Two dark brown bands which sometimes coalesce, start on the parietals and extend on to the back, where they break up into spots. Numerous transversely arranged yellow spots on the back and tail. A dark brown band starts on the loreal region and extends on to the side where it breaks up into spots. Labials yellow, sometimes barred with brown. Throat reticulated with brown. Under surfaces uniform yellowish.

Length of largest specimen, from snout to vent, 95 mm.

Egernia formosa has the general appearance of *E. striolata*,¹ Peters, but in reality is widely separated from that species. In Dr. Werner's key² to the species of the genus *Egernia* it must be placed in the division I. A., the species of which are characterised by the cylindrical tail and the smooth scales. Of the five species in this division it shows affinity with the first two only, *Egernia luctuosa*, Peters³ and *E. lauta*, de Vis.⁴ From the former it is distinguished by the presence of a curved groove behind the nostril and in having twenty-eight scales round the body; from *E. lauta* it also differs by the possession of a post-narial groove, while there are no infraoculars in *E. formosa* and much longer limbs.

The separation of the palatine bones by the palatal notch is characteristic of *Egernia*.⁵ Though this condition is maintained in all my specimens yet the fleshy intergument covering them over-reaches their edges so that they appear to be in contact in the median line.

¹ Peters—Mon. Berl. Acad., 1870, p. 642 (*Tropidolepisma striolatum*).

² Werner—Fauna Südwest-Austr., II, 1910, p. 472.

³ Peters—*loc. cit.* 1866, p. 90 (*Cyclodus* [*Omolepida*] *luctuosus*).

⁴ de Vis—Proc Linn. Soc., N.S.W., 2nd ser., II, 1887, p. 813.

⁵ Boulenger—Brit. Mus. Cat. Liz., 2nd ed., III, 1887, p. 134.

I have also found the same structure in *E. striolata* and *E. whitei*. A knife passed between the fleshy lobes, however, shows the true condition of the bones.

Localities.—Eight specimens are before me, six adults and two young. The Type, together with three other specimens, was presented to the Trustees of the Australian Museum by Mr. W. D. Campbell, who collected them at Perth. There are also three other specimens collected by the same gentleman at Boulder. A single specimen, figured on Pl. XXVII, Fig. 2, and Text Fig. 4, is in the Collection forwarded by Mr. Woodward, but is unfortunately without data.

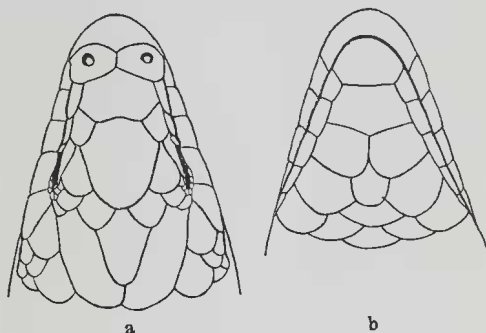
Type:—In the Australian Museum, Sydney. Reg. No. R. 3058. A co-type is deposited in the Western Australian Museum

LYGOSOMA (RHODONA) PICTURATUM, sp. nov.

PLATE XXVII. FIG. 3, AND TEXT FIGURE 5.

Head small, sub-cuneiform. Snout rounded, acutely produced in profile, three to four times as long as the orbital diameter, with a slightly projecting labial ridge. Eye small; the lower eyelid with a transparent disc. Ear visible, minute, but generally covered with scales. Rostral twice as broad as high, highest in the mid-line; forming an arcuate suture with each nasal. Nostril pierced in the centre of a large swollen nasal which forms a moderate suture with its fellow. Fronto-nasal once and one-quarter to once and three-quarters as broad as long, forming a broad, curved suture with the frontal. Praefrontals small and widely separated; sometimes united with the posterior loreal and in contact with the second and third, or the third upper labial. Frontal large, much broader than the supraocular region; a little longer than broad; almost as long as its distance from the end of the snout; in contact with the first supraocular. Supraoculars two, first much the larger. Three or four supraciliaries, the first one sometimes very long. Upper eyelid represented by a row of very small intricate scales between the supraciliaries and the orbit. A group of small, irregular prae- and postocular scales. Frontoparietals separated by the interparietal; about as large as the first supraocular, larger than the praefrontals. Interparietal moderate, narrowly in contact

with the frontal. Parietals rather narrow, forming a suture behind the interparietal. Two to four pairs of indefinitely enlarged nuchals. Temporal shields three, the two bordering the parietals large.



TEXT FIG. 5.—*Lygosoma (Rhodona) picturatum*, sp. nov.

a. Dorsal view of head, enlarged.

b. Ventral view of head, enlarged.

Labials $\frac{6}{6}$, the fourth upper entering the orbit, the fifth largest. Two elongate loreal shields, one, the posterior, sometimes united with the praefrontal. Eighteen to twenty polished scales round the body. Praeanals distinctly enlarged. Fore limbs very minute, represented by a scarcely visible papilla situated in a depression, or by a styli-form rudiment which may be as long as the eye. Hind limbs didactyle as long as, or nearly as long, as the distance between the eye and the fore limb; contained almost four, to nearly five times in the distance between the axilla and the groin. Toes compressed; twelve to fourteen lamellae under the longest. Tail as thick as the body.

Colour (Spirits):—Buff-coloured above. Head shields edged with brown. Two to four rows of spots confluent into distinct lines on the back and tail. A dark brown lateral band runs from the nostril, along the side, to the end of the tail. Uniform yellowish beneath.

Length of largest specimen, from snout to vent, 92 mm.

This species presents two more or less distinct varieties which may be separated as follows:—

Variety A (typical form).—Rows of spots forming four lines down the back. Fore limb a distinct styli-form rudiment at least as long as the eye. Twenty scales round the body.

Variety B.—Only two distinct lines down the back. Fore limb represented by a minute papilla, situated in a small depression, below the general surface. Eighteen to twenty scales round the body.

Lygosoma picturatum is allied to *L. gerrardi*, Gray,¹ but also appears to possess affinities with *L. walkeri*, Blgr.² The three species may be distinguished as follows:—

Lygosoma gerrardi, Gray.

Three supraoculars, second largest. Five supraciliaries. Frontoparietals distinct. Yellowish above with a dark lateral and a broad dorsal band.

Lygosoma picturatum, sp. nov.

Two supraoculars, the first much the larger. Three or four supraciliaries. Frontoparietals distinct. Buff coloured above, with a dark lateral band and two to four rows of spots confluent into lines on the back and tail.

Lygosoma walkeri, Blgr.

Three supraoculars, second largest. Five supraciliaries. Frontoparietals fused into a single shield. Greyish above, each scale with a black dot, which is largest on the fourth scale from the mid-dorsal line.

Localities.—I have examined nine specimens of this new species. Two, including the Type, were presented to the Trustees of the Australian Museum by Mr. W. D. Campbell, who collected them at Boulder. A third specimen was collected by the same gentleman at Perth. Five other specimens are without locality, and differ somewhat from the typical form in having only two lines down the back. In the collection forwarded by Mr. Woodward is a single large specimen, figured on Plate XXVII, fig. 3, and Text fig. 5. This specimen is unfortunately without data.

Type.—In the Australian Museum at Sydney, Reg. No. R. 3101. A co-type is in the W.A. Museum.

¹ Boulenger—Brit. Mus. Cat. Liz., 2nd ed., III, 1887, p. 335, pl. XXVII, fig. 3.

² Boulenger—Ann. Mag. Nat. Hist. (6), VIII, 1891, p. 405.

CRYPTOBLEPHARUS RHODONOIDES. L. & F.

Ablepharus rhodonoides, Lucas and Frost, Proc. Linn. Soc. N.S. Wales, XXI., 1896, p. 281.

? *Ablepharus distinguendus*, Werner, Faun. Südwest. Austr., II., 1901, p. 490.

The resemblance between this small *Cryptoblepharus* and *Lygosoma (Rhodona) fragile*, Günther, is very striking indeed, rendering the specific name proposed for it by Messrs. Lucas and Frost a very appropriate one. It was originally described from Mildura, a township on the Victorian side of the Murray River. I am now able to extend its range to both Western Australia and New South Wales. In the Western Australian Collection is a specimen from the Strelley River. The Australian Museum Collection contains numerous specimens from the following localities:—Perth and Boulder, Western Australia; Mildura, on the Murray River, Victoria (one of the types); Darling River, Moloch, Bindogmidra and Narramine, on the Western Plains of New South Wales.

A careful examination of all my specimens shows that this species is not a variable one, indeed I can find no point in which they differ from the original description, or from the co-type specimen in the Australian Museum.

It seems to me very probable that the scink described by Dr. Werner as *Ablepharus distinguendus* really belongs to this species. Dr. Werner's description is very meagre however, and I cannot be sure of this. The only difference that I can detect is in the number of scale rows, which in his new species are eighteen in number whereas in all my specimens of *C. rhodonoides* they are in twenty. *A. distinguendus* is stated to be very closely allied to *Cryptoblepharus muelleri*, Fischer, with which species Messrs. Lucas and Frost also compare *C. rhodonoides*.

OPHIDIA.

(SNAKES.)

LIASIS OLIVACEUS, Gray ?

Liasis olivaceus (Gray), Boulenger, Brit. Mus. Cat. Sn., I., 1893, p. 79, pl. IV., fig. 2.

There is a large skin in the collection which differs so much from Boulenger's description that it should perhaps be regarded as a distinct species. With our limited knowledge of the variations of this snake however it is safer to merely record these variations and await additional material. The differences will be seen from the following table.

<i>L. olivaceus.</i>	<i>L. olivaceus. ?</i>
V. 349-361.	V. 357.
S. C. 100-102.	S.C. 101.
Scales in 69-75 rows.	Scales in 56-64 rows.
Labials $\frac{13}{15}$ $\frac{15}{16}$.	Labials $\frac{11}{12}$.
Rostral broader than high.	Rostral higher than broad.
Eye larger than its distance from the mouth.	Eye smaller than its distance from the mouth.
Frontal $1\frac{1}{2}$ as long as broad.	Frontal $1\frac{1}{4}$ as long as broad.
A small azygous shield (often absent) separates the praefrontals.	A large well defined six-sided azygous shield separates the praefrontals.
Internasals more than half as long as anterior praefrontals.	Internasals half as long as anterior praefrontals.

There are five lower labials pitted, the pits being decidedly stronger than those figured by Boulenger. The parietals are in contact behind the frontal and are considerably larger than he shows them.

DEMANSIA, Gray.

Demansia, Gray, Zool. Miscell., 1842, p. 54 (for *Elaps psammophis*, Schleg.)

Diemansia, Günther, Cat. Col. Sn., 1858, p. 254.

Diemenia, Günther, Ann. Mag. Nat. Hist., (3). XII., 1863, p. 350. *et auctorum*.

The generic name *Diemenia* used by recent authors is untenable. It was originally spelt *Demansia* by Dr. Gray but was

afterwards altered to *Diemansia* and *Diemenia* by Dr. Günther. *Diemenia* has been used by all recent authors but the name as originally spelt must be used.

The following pages include descriptions and notes on the Western Australian species of the genus, based on the material forwarded by Mr. Woodward together with numerous specimens in the collection of the Australian Museum.

Key to the Western Australian species of *Demansia*.

- A. Scales in fifteen rows.....*D. psammophis* var. *reticulata*, Gray.
- B. Scales in seventeen rows.
- c. Portion of rostral visible from above measuring about half its distance from the frontal. V. 154-178, S.c. 38-51 pairs.....*D. modesta*, Günther, p.
- cc. Portion of rostral visible from above about three quarters as long as its distance from the frontal. Snout broadly rounded. Head with brown smudges; back with scattered brown spots. V. 215-225, S.c. 52-63 pairs, *D. affinis*, Günther, p.
- ccc. Portion of rostral visible from above as long as its distance from the frontal. Head tapering, sides nearly straight, snout more or less truncate. V. 184-224, S.c. 49-66 pairs.....*D. nuchalis*, Günther, p.

DEMANSIA PSAMMOPHIS, Schl., var. *reticulata*, Gray.

Diemenia psammophis, var. *reticulata*, Boulenger, Cat. Sn. Brit. Mus. III., 1896, p. 323.
Diemenia reticulata, Lucas and Frost, Rept. "Horn" Sci. Expdn., II., 1896, p. 147.
Diemenia psammophis, Werner, Fauna Südwest-Austr., II., 1909, p. 257.

Scales 15 rows on anterior half, 13 on posterior half of body. Oc. 1 + 2 or 3. Temp. 2 + 2. V. 176-197. S.c. 65-79 pairs

Several specimens of var. *reticulata* are in the collection. They are all a light olive with a very distinct reticulated pattern. The hinder third of the body is somewhat lighter, shading to yellowish brown at the tip of the tail. A black, yellow edged, streak passes from eye to eye round the rostral, and another larger one beneath the eye passes obliquely downwards and backwards. A yellow spot on the praeocular; labials yellow. Yellowish or creamy white beneath

Localities.—This well marked variety is confined to Central and Western Australia. Messrs. Lucas and Frost record it from Alice Springs and Charlotte Waters, Central Australia, and Dr. Werner from Northam, W.A. In the Australian Museum are specimens from Perth and Strelley River, Pilbara. Several specimens of *D. psammophis* from Bourke and Moree, western N.S.W., belong to the typical variety, while one from North Australia is the form described by Macleay as *D. papuensis*.

DEMANSIA MODESTA, Günther.

Cacophis modesta, Günther, Ann. Mag. Nat. Hist. (4), IX, 1872, p. 35, pl. III, fig. C.

Furina ramsayi, Macleay, Proc. Linn. Soc. N.S.W., X, 1885, p. 61.

" " Lucas and Frost, Rept. "Horn" Sci. Expdn., II, 1896, p. 149.

? *Brachysoma sutherlandi*, de Vis, Proc. Roy. Soc. Q'land., I, 1884, p. 139.

? *Pseudelaps sutherlandi*, Boulenger, Cat. Sn. Brit. Mus., III, 1896, p. 320.

? *Pseudelaps sutherlandi*, Longman, Mem. Q'land. Mus., I, 1912, p. 24.

Diemenia modesta, Boulenger, Cat. Sn. Brit. Mus., III., 1896, p. 320.

Scales 17 rows. Temp. 1 + 1 or 2, V. 154-178, S.c. 38-51 pairs.

This species is at once distinguished from its congeners, *D. textilis* and *D. affinis*, by its smaller number of ventral and subcaudal plates. In the specimens before me, all of which are young, the dark cross bands vary considerably according to the age of the specimen. They become indistinct, in some cases quite obsolete, at a somewhat earlier stage than do the bands in young examples of *D. textilis*. I have not seen any fully adult examples of this species, but, judging from Dr. Boulenger's description, the cross bands in some specimens remain throughout life, as in exceptional cases in *D. textilis*.

I have examined the three specimens from Milparinka, western N.S.W., labelled types of *Furina ramsayi*, Macleay, and find they are identical with the young of *D. modesta*. There are some discrepancies in Macleay's description. According to that author the ventrals are 162 and the subcaudals 38 pairs in the largest specimen, whereas I find them to be 178 and 43 pairs respectively. In the second largest specimen they read V. 165, S.c. 49 pairs, and in the smallest, V. 169?, and S.c. 45 pairs. In the latter specimen, which is apparently just hatched, the frontal is twice as broad as the supraocular, and proportionately large. This feature I have observed in very young snakes of other species.

Localities.—*D. modesta*, Günther, is recorded from the following localities :—Perth ; the North-West (types, Günther, 1872, and Boulenger, 1896) ; Geraldton (Boulenger, 1896), Milparinka, Barrier Range, Western N.S.W. (types of *Furina ramsayi*, Macleay, Austr. Mus.) ; Crown Point, Horse Shoe Bend, Finke River, Central Australia (Lucas and Frost, 1896) ; Norman River, North Queensland (types of *Brachysoma sutherlandi*, de Vis, 1884, Q'land. Mus.) ; Lawlers and Boulder, W.A. (Austr. Mus.).

DEMANSIA TEXTILIS, D. & B.

Diemenia textilis, Boulenger, Cat. Sn. Brit. Mus., III., 1896, p. 325.

Although there are several mentions of *D. textilis* occurring all over Australia, I know of no authentic record of its occurrence in Western Australia. Krefft¹ gives "Australia generally" as the habitat of *Diemenia superciliosa*, as it was then called. Again he says,²—"A species which . . . ranges from the East to the West Coast, and perhaps extends all over the whole continent." Speaking of *D. nuchalis*, Waite³ is of the opinion that "it is possible that the Brown Snakes (*D. textilis*) recorded from Western Australia are referable to this species."

DEMANSIA AFFINIS, Günther.

PLATE XXVII, FIG. 4, AND TEXT FIG. 6A.

Pseudonaja affinis, Günther, Ann. Mag. Nat. Hist., (4), IX, 1872, p. 35, pl. IV, fig. C.

" " Macleay, Proc. Linn. Soc. N.S.W., II, 1878, p. 29.

" " Lucas and Frost, Rept. "Horn" Sci. Expdn., II, 1896, p. 148.

Diemenia nuchalis (part), Boulenger, Cat. Sn. Brit. Mus., III, 1896, p. 326.

Head broad ; snout not truncate but broadly rounded. Eye moderate. Rostral broader than deep, the portion visible from above almost as long as its distance from the frontal ; internasals two-thirds to four-fifths the length of the prefrontals ; frontal broader than the supraocular, once and a half as long as broad two-thirds the length of the parietals ; nasal entire or semi-divided. Two or three postoculars ; temporals 1 + 2. Six upper labials, last very large, third and fourth entering the eye. Scales in seventeen to twenty-one rows. V. 215-225. S.c. 52-63 pairs.

¹ Krefft—Austr. Vertebr., Foss. and Recent, Sydney, Feb. 1871, p. 54.

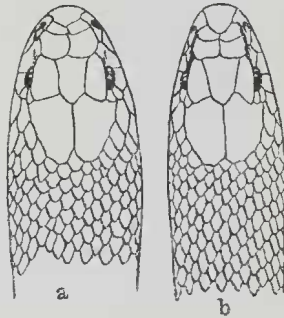
² Krefft—Vertebr. Lower Murray, 1865, p. 31.

³ Waite—Australian Snakes, 1898, p. 51.

Colour (Spirits):—Uniform brownish above, lighter on the head and the sides. Head with dirty smudges and a few scattered, irregularly placed dark brown spots. Sides and back with irregularly distributed, more or less abundant dark brown spots, which in many cases exactly cover one scale. Under surfaces uniform yellowish olive, or finely peppered with grey. Throat yellowish or dark bluish grey.

Total length of largest specimen, 1525 mm., tail, 250 mm.

I have examined four specimens of this *Demansia* and think it will prove constantly distinct from *D. nuchalis*. After examining Dr. Günther's type specimen Dr. Boulenger placed this species in the synonymy of *D. nuchalis*, possibly regarding such slight differences founded on a single specimen as not of specific value. With four additional specimens at hand however, all of which differ in the same characters from *D. nuchalis*, I propose to raise *D. affinis* to specific rank. When placed side by side the two forms appear



TEXT FIG. 6.

- a. *Demansia affinis*, Gthr.
(After Günther, from type specimen, reduced.)
b. *Demansia nuchalis*, Gthr.
(After Günther, reduced.)

strikingly different, but a closer examination shows that the differences are mainly in the general appearance, the outline of the head (see Text figs. 6a and 6b), and the colouration. Also, Messrs. Lucas and Frost record a specimen in which the scales are in twenty-one rows, the greatest number recorded for the genus.

Localities.—*Demansia affinis* is known from the following localities:—Australia (type, Günther, 1872). Reedy Creek, George

Gill Range, Central Australia (Lucas and Frost, 1896). Western Australia (W. A. Mus.); S.W. Australia (Austr. Mus.) King George Sound (Macleay Mus.)

DEMANSIA NUCHALIS, Günther.

(FIG. 6b.)

- Pseudonaja nuchalis*, Günther, Cat. Col. Sn., 1858, p. 227.
 " " Günther, Proc. Zool. Soc., 1863, p. 17, fig.
 " " McCoy, Ann. Mag. Nat. Hist., (3), XX., 1867, p. 182.
 " " Krefft, Sn. Austr., 1869, p. 44, pl. XII., fig. 13.
 " " Macleay, Proc. Linn. Soc., N.S.W., II., 1878, p. 219.
 " " de Vis, Proc. Roy. Soc. Q'land., I., 1884, p. 58.
 " " Lucas and Frost, Rept. "Horn" Expdn., II., 1896, p. 148.
Diemenia aspidorhyncha, McCoy, Prodr. Zool. Vic., 3., 1879, p. 13, pl. XXIII., fig. 4.
Diemenia nuchalis, Boulenger, Cat. Sn. Brit. Mus., III., 1896, p. 326.
 " " Werner, Fauna Südwest-Austr., II., 1909, p. 257.
Pseudelaps bancrofti, de Vis, Ann. Q'land. Mus. X., 1911, p. 25.
 " " Longman, Mem. Q'land. Mus., I., 1912, p. 24.

Head tapering and truncate at the snout, the sides almost straight in the adult but somewhat curved in the young. Eye moderate. Rostral broader than deep, the portion visible from above may be a little longer than its distance from the frontal or not quite as long; internasals shorter than the praefrontals; frontal considerably broader than the supraocular, once and a half to almost twice as long as broad, a little shorter to a little longer than its distance from the tip of the snout, two-thirds to four-fifths the length of the parietals. Nasal entire or semi-divided, in contact with a single praecocular two or three postoculars; temporals 1 + 2 or 3; six upper labials, third and fourth entering the eye, sixth very large. Scales in seventeen to nineteen rows. V. 184-224; anal divided; S.c. 49-66 pairs.

Colour (Spirits):—

Var. A. Body uniform light or dark brown above. A. nuchal collar may be present. Under surfaces greenish grey or yellowish; throat slightly darker (A melanotic form, in which the head, neck and anterior parts of the body are rich brown or black, occurs in this variety.

(Vars. A. and C. of Lucas and Frost; vars. A. and B. part only? of Boulenger; vars. I, II, III of Werner.)

Var. B. Body light or dark brownish above, variegated with black or dark brown. The scales may be edged with darker (edged with lighter according to McCoy in *D. aspidorhyncha*), or there may be bands of darker colour or zig-zag lines of dark brown. These markings, if not confined to the posterior two-thirds of the body are most distinct in that region. One or two black nuchal bands are rarely present. Ventrals olive, greyish or yellowish, uniform or with round dark spots on those of the posterior moiety. Throat sometimes peppered with grey.

A melanotic form also occurs in this variety. (Vars. B. and E. of Lucas and Frost; var. B. part only? of Boulenger; vars. IV and V of Werner).

Total length of largest specimen (Kreffft), 1600 mm., tail 300 mm.

Demansia nuchalis is an extremely variable species both in colouration and in structural characters. The youngest specimen I have seen is sixteen inches in length, in which the colouration is like that of some of the adult specimens. This suggests that the young of this species, unlike the young of *D. textilis*, and *D. modesta*, may not have distinct black bands round the body. I have examined two melanotic specimens which do not otherwise differ from the typical form, and, as this form is present in both varieties it would appear to be quite sporadic in its occurrence.

Localities.—This species is known from the following localities:—Swan River and Geraldton; North-Western Australia; Port Essington, Northern Territory (Boulenger, 1896); Edel Land, Baba Head and Rottneest Island, W.A. (Werner, 1909); Alice Springs and between Laurie's Creek and Glen Edith, Central Australia (Lucas and Frost, 1896); Port Darwin, Northern Territory (Macleay, 1878); Stannary Hills, Central Eastern Queensland (de Vis, 1911, as *Pseudelaps bancrofti*). In the Australian Museum are specimens from Perth, 80 miles south of Perth, and Beverley, W.A.; Hermidale, near Nyngan, Western N.S.W., and Yandembah, Riverina, N.S.W.

PSEUDECHIS AUSTRALIS, Gray.

A very large specimen is in the collection which is of interest as the characters exhibited show an overlapping between *P. denisonioides*, Werner¹ and *P. australis*, Gray. The ventrals are 189 and the subcaudals $40 + \frac{14}{13}$ (54 in all), thus agreeing almost exactly with the scaling of *P. denisonioides*, V. 189, S.c. $34 + \frac{9}{9} + 1$, (54 in all). In *P. denisonioides* the internasals are one-third as long as the praefrontal, a condition exhibited by none of the specimens of *P. australis* that I have seen. The frontal is half as long as the parietal in Werner's new species, but in my specimen it is only three-fifths as long, the normal for *P. australis* being two-thirds the length of the parietals. Other differences in Werner's species are a single anal and the greater extension of the rostral on the dorsal surface of the snout.

I have examined a number of specimens of *P. australis* and find that this species varies very considerably. *P. denisonioides*, however, differs so much that the above could not be regarded as uniting the two species, but shows at least that the scaling overlaps.

The scale formulae of *P. australis* should now stand:—V. 189-220; Anal 2, S.c. 8-41 single + 14-54 paired. Total 53-70. Temporals 1-2 + 2.

FURINA BIMACULATA, D. and B.

TEXT FIG. 7.

Furina bimaculata, Dum. and Bibr., Erp. Gen., VII, 1854, p. 1240.

" " Jan., Rev. and Mag. Zool., 1859, p. 125, pl. VI.

Pseudelaps bimaculatus, Jan., Icon. Gen., Livr. 43, 1873, pl. V., fig. 2.

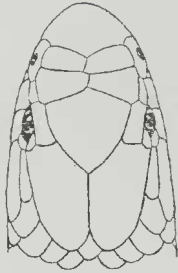
Furina bimaculata, Boulenger, Cat. Sn Brit. Mus., III, 1896, p. 406 (see synonymy).

" " Werner, Fauna, Süd.-Austr., II., 1909, p. 262.

There are two specimens of this rare snake in the collection. The largest 317 mm. long and has 181 ventrals, 30/29 subcaudals, 2 anals, 1 + 1 temporals, the first very long. The smaller specimen which is 230 mm. long differs somewhat from Boulenger's descrip-

¹ Werner—Fauna Süd.-Austr., II, 1909, p. 258.

tion in having 217 ventrals, 20/19 subcaudals, and in being uniformly coloured on the body. The two characteristic black bands on



TEXT FIG. 7.

Furina bimaculata, D. and B.

Dorsal view of head enlarged.

The upper head shields of the larger specimen are figured.

the nape and head are present in both specimens, but the smaller one has a black blotch on the rostral. With these variations and those noted by Werner the scale formulae should now stand:—Sc. 15 rows, V. 181-217, S.c. 20/19 to 30/29. Anal 2. Labials $\frac{5}{4}$. Temporals 1 + 1-2.

BATRACHIA.

(FROGS AND TOADS).

KEY TO THE WESTERN AUSTRALIAN FROGS AND TOADS.

- A. Toes free or fringed only, ¹ the fringe sometimes forming a very membrane at the base of the toes.
- B. Inner metatarsal tubercle large, *shovel-shaped*.
- C. Teeth in two transverse series *behind* the choanae.
- D. A large parotoid-like gland on the calf of the leg. Brown above with dark brown spots or bands and a light dorsal stripe.
Limnodynastes dorsalis, Gray, var. *typica*.
- DD. No parotoid-like gland on the calf of the leg. Back beautifully variegated with symmetrical greyish and yellowish marks. Rarely a dorsal band.
Limnodynastes ornatus, Gray.
- CC. Teeth in two groups *between* the choanae.
- E. Back granulated. Brown or purplish-black above, uniform or with lighter spots.
Heleioporus albopunctatus, Gray.

¹ In the case of *Limnodynastes ornatus* the toes may be fringed only, or as much as two-thirds webbed. This species is therefore placed in both divisions of the Key, A. and A.A.

BB. Inner metatarsal tubercle *moderate or small*; not or but little larger than the other.

F. Under surfaces *smooth*.

G. A large *white spot* on the hinder side of the thighs.

H. A large swollen parotoid gland on the shoulder. Two rather large sub-equal metatarsal tubercles. Dark spotted beneath.

Uperoleia marmorata, Gray.

GG. No large white spot on the hinder side of the thigh.

I. *Smooth above*. No parotoid gland. A broad dark brown band starts between the eyes and extends to the sacral region where it bifurcates. Beneath spotted with darker.

Crinia leai, Fletcher.

II. Upper surfaces with *prominent smooth warts*. An indistinct subcircular parotoid gland on the shoulder. Brown or olive above, lighter on the forehead and a few large patches on the back. Beneath with faint marks

Pseudophryne guentheri, Boulenger.

FF. Under surfaces coarsely *wrinkled, not granular*.

J. Tympanum hidden. Habit extremely stout. Limbs excessively short. Toes not longer than the fingers.

Myobatrachus gouldii, Gray.

FFF. Under surfaces *granular*.

K. Tympanum slightly distinct. Vomerine teeth present or absent. Belly *immaculate*. Hinder side of thighs *carmine*.

L. Back with warts or folds. Middle of back dark brown, A broad dorso-lateral yellowish band, sometimes divided by fine lines.

Crinia georgiana, Bibr., var. *stolata*, Cope.

LL. Back quite smooth. A dark lateral streak.

Crinia georgiana, Bibr., var. *affinis*. Günth.

- KK. Tympanum quite hidden. Vomerine teeth none. Belly dark *spotted or marbled*. Hinder side of thighs *dark*, uniform or variegated.
- M. Snout rounded, as long as the orbital diameter. Sub-articular tubercles rather small. A slight tarsal fold.
Crinia signifera, Girard.
- AA. Toes distinctly *webbed* from one third to fully so.
- N. Toes not more than half webbed. *A large oval, compressed*, inner metatarsal tubercle.
- O. Teeth *between* the choanae.
- P. Habit stout. Head rather pointed. Back with *large warts*. Toes short, one third to one half webbed. Brownish variegated above; sometimes a fine dorsal stripe.
Phractops brevipalmatus, Günther.
- PP. Habit stout. Head *very large*; snout broadly rounded. Back finely *granulated* and with fine dorso-lateral fold. Toes short, broadly fringed, about half webbed. Greyish peppered with black above. Hinder side of thighs uniform. Head variegated. Young spotted above.
Phractops australis, Gray.
- PPP. Habit rather *slender*. Head long and pointed. Back warty, with longitudinal folds. Toes *long* nearly *entirely* webbed. Uniform or marmorated brown above. A canthal streak. Hinder side of the thighs and groin with black and white spots.
Phractops alboguttatus, Günther.
- OO. Teeth in two transverse series *behind* the choanae.
- Q. Tympanum very indistinct. Head high; snout very short. Back beautifully variegated.
Limnodynastes ornatus, Gray.
- NN. Toes webbed to or almost to the discs. Inner metatarsal tubercle *not shovel-shaped*, generally not different from the outer when present.
- R. Fingers *at least one-third webbed*. Discs *very large*.

- S. *Uniform* green above (bluish in spirits). Vomerine teeth in two groups on a level with the *hinder edge* of the choanae.
Hyla caerulea, White.
- SS. *Variigated* brown above; hinder side of thighs black marbled. Vomerine teeth in two groups *between* the choanae.
Hyla peronii, Bibron.
- SSS. Finger discs two-thirds the tympanum; discs of toes *small*. Front and hinder side of thighs, groin and axilla, *excessively* blotched with black.
Hyla peronii, Bibr., var. *rothii*, de Vis.
- RR. Fingers *free or webbed at the base*. Discs generally small, sometimes not enlarged.
- T. Fingers *webbed at the base*. Discs distinctly enlarged, as large as the tympanum or only half so.
- U. Discs of fingers as large as the tympanum. Head broader than long; snout *rounded*. Hinder side of thighs and groin with large purplish black spots.
Hyla ewingii, D. and B., var. *calliscelis*, Ptrs.
- UU. Discs of fingers distinct, only half the tympanum. Head longer than broad; snout *prominent*. Hinder side of thighs dark, uniform or with white spots.
Hyla adelaidensis, Gray.
- TT. Fingers *quite free*. Discs of fingers never more than half the size of the tympanum, sometimes scarcely enlarged. Generally a small outer metatarsal tubercle.
- V. Habit *moderate*. The tibiotarsal articulation of the outstretched limb reaches the nostril or not so far.
- W. Hinder side of thighs bluish or greenish, *uniform*. A broad dorsal and a lateral stripe. Under surfaces *uniform* creamish-white.
Hyla aurea, Lesson, var. *typica*.

WW. Hinder side of thighs *black with white spots*.
Belly and under surfaces of thighs with
dense black and brown *reticulations*
(absent in young).

Hyla aurea, Less., var. *cyclohrhynchus*, Blng.

VV. Habit *very slender*. The tibiotarsal articulation of
the outstretched limb reaches the tip of the snout
or far beyond.

X. Back *smooth* or with very *faint smooth warts*.
Hinder side of thighs with very accentuated
black markings.

Hyla latopalmata, Günther.

XX. Back with *longitudinal folds* and dark with
light brown stripes. Hinder side of thighs
longitudinally striped with black or brown.
Snout and toes excessively long, the tibio-
tarsal articulation of the outstretched limb
reaching far beyond the tip of the snout.

Hyla nasuta, Gray.

LIMNODYNASTES ORNATUS, Gray.

- Limnodynastes ornatus*, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 262.
" " Spencer, Rept. "Horn" Sci. Exped. Centr. Austr., II.,
1896, p. 156, pl. XII., figs 3 and 4 and pl. XV., figs.
18-25.
" " Fletcher, Proc. Linn. Soc. N.S.W., XXII., 1897 (1898),
pp. 676 and 682.

Locality.—Napier Broome Bay, Northern coast of W.A. One
specimen.

LIMNODYNASTES DORSALIS, Gray, var. TYPICA, Fry.

- Limnodynastes dorsalis*, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 261.
" " Fletcher, Proc. Linn. Soc. N.S.W., XXII., 1897 (1898),
p. 675.
" " var. *typica*, Fry, Rec. Austr. Mus., X., 1913, p. 24, pl. II,
fig. 2.

Ten specimens are in the collection. I have utilised these in
an already published account of the variations of *L. dorsalis*.

CRINIA GEORGIANA, Bibr., var. STOLATA, Cope.

(PLATE XXVIII., FIG. 1.)

Crinia georgiana var *stolata*, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882,
p. 264. * *

Vomerine teeth in two indistinct, convergent groups, behind the level of the choanae. Tongue rather large, elongate oval and entire. Tympanum slightly distinct. Fingers and toes with a slight fringe. Subarticular tubercles well developed; palmar and plantar surfaces with numerous distinct granules. Two distinct metatarsal tubercles. Tarsal fold very indistinct. Upper surfaces with longitudinal folds and warts. Under surfaces coarsely granular.

Colour (Spirits).—Back with a broad dark median area which is variegated with darker. A yellow dorso-lateral band, divided by numerous thread-like lines, starts behind the eye and bifurcating, runs to the groin. Sides of body and head variegated and striped. Legs barred and beautifully variegated with light and dark brown. Groin and hinder side of thigh bright carmine. Under surfaces with a few faint grey spots, most distinct on the throat.

Total length from snout to vent ... 24 mm.

Width of head 8.5 mm.

Length of head to level of tympana 8 mm.

Length of the outstretched hind limb 34 mm.

This is a very beautiful variety and is very distinct. The specimen figured on Plate XXVIII, fig. 1, agrees in all essentials with Bell's figure ¹ of *Cystignathus georgianus*, but I regret that I am unable to refer to Cope's original description ² of *Crinia stolata*.

Locality.—A single specimen from the Margaret River in the collection.

CRINIA LEAI, Fletcher.

(PLATE XXVIII., FIGS. 2 and 2a.)

Crinia leai, Fletcher, Proc. Linn. Soc. N.S.W., XXII., 1897 (1898), p. 677.

Vomerine teeth in two distinct, convergent groups behind the choanae, or they may be entirely wanting. Tongue rather large, elongate oval and entire. Tympanum quite hidden. Fingers

¹ Bell—Zool. "Beagle" Rept., 1843, p. 33, pl. XVI., fig. 4.

² Cope—Journ Acad. Philad. (2), VI., 1867, p. 201.

cylindrical, not fringed, first shorter than second. Toes with a distinct fringe or devoid of a fringe. Subarticular tubercles low and flat, rather indistinct. Palmar and plantar surfaces devoid of granules. A small inner metatarsal tubercle. No tarsal fold. Upper and lower surfaces smooth except for a granulated area on the under surface of the thighs.

Colour (Spirits).—Dark or light blackish-grey above, forehead lighter. A broad black, sometimes light edged band starts between the eyes and runs to the sacral region, bifurcating to a varying extent. This band may be represented by spots only. A dark streak on the canthus rostralis. Lips spotted. Legs and arms transversely barred with black, sometimes absent. A dark, light-edged streak or triangular spot on the hinder side of the thighs near the anus. Under surfaces with numerous blackish-grey spots, the shank, tarsus and metatarsus being much darker, sometimes blackish.

Total length from snout to vent ...	22 mm.
Width of head	8 mm.
Length of head	8 mm.
Length of outstretched hind limb ...	34 mm.

Locality.—A single specimen is in the collection from the Margaret River, which agrees well with Mr. Fletcher's description.

PHRACTOPS AUSTRALIS, Gray.

Chiroleptes australis, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 269.
 " " Fletcher, Proc. Linn. Soc. N.S.W., XXII., 1897 (1898), pp. 678 and 682.

There is a single example in the collection which differs from eastern specimens in having a smoother back, slightly narrower head, and a very accentuated canthal and temporal streak.

Locality.—Napier Broome Bay.

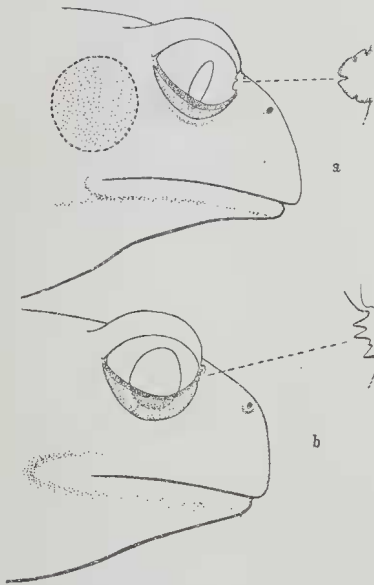
HELIOPORUS ALBOPUNCTATUS, Gray.

TEXT FIGS. 8b. AND 10.

Helioportus albopunctatus, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 271.
 " " Fletcher, Proc. Linn. Soc. N.S.W., XXII., 1897 (1898), p. 678.

I find a small but constant structure in this species which appears to have hitherto escaped notice. At the anterior corner of

the eye (see Text Fig. 8b) is a small fold of integument, beset with three or four conical papillae, which when the eye is closed, fits over the anterior junction of the upper and lower eye-lids. This structure is apparently of secondary importance during burrowing operations which have unfortunately never been observed in this species. However, in allied burrowing forms, and in particular *Philocryphus flavoguttatus* and *Limnodynastes dorsalis*, var. *dumerilii* burrowing has been carefully observed and there is no reason to believe that it differs to any extent in *H. albopunctatus*. The large eyes which under normal conditions protrude considerably, can be withdrawn well into the orbits and even to below the general surface of the head. This is done during the burrowing process by the two species mentioned above, just before the frog's head disappears beneath the surface of the earth, and it will be found if the mouth be opened and examined at this stage that its cavity is nearly filled by the downward bulge of the orbits. The upper eyelid has little power movement, but by the contraction of the eye into the orbit it is drawn considerably over the eye, while the thin semi-transparent lower lid is drawn up under its outer edge. When so closed, this serrated flap of skin



TEXT FIG. 8.

- a. *Philocryphus flavoguttatus*, Fletcher.
Side view of head, enlarged.
- b. *Helioforus albopunctatus*, Gray.
Side view of head, enlarged.

which is a direct downward continuation of the upper eye-lid, would function as a valve to prevent the small particles of grit from entering the eye during the frog's passage through the earth. In *Philocryphus flavoguttatus* (Text-fig. 8a) an homologous structure occurs, but differs from that of *H. albopunctatus* (Text-fig. 8b) in being larger and semi-circular in outline, with several nicks on its free edge. It is also to be regarded as of an accessory nature as it is not a direct continuation of the upper eyelid, but quite separate from that structure. *Helioporus pictus* and *Limnodynastes dorsalis*, which are both burrowers, possess no such apparatus, but in the former, the anterior free edge of the upper eye-lid overlaps the lower to an unusual extent, and apparently serves the same purpose. In *Pomatops valvifera*, a New Guinea representative of the Family Engystomatidae. Dr. Barbour¹ records an interesting development of this nature. The upper eye-lid is in the form of a flap of skin which extends for some distance anterior and posterior to the eye, and which is sufficiently developed to allow of its laying down so that it covers the whole eye. By analogy Dr. Barbour regards this frog as a burrower.

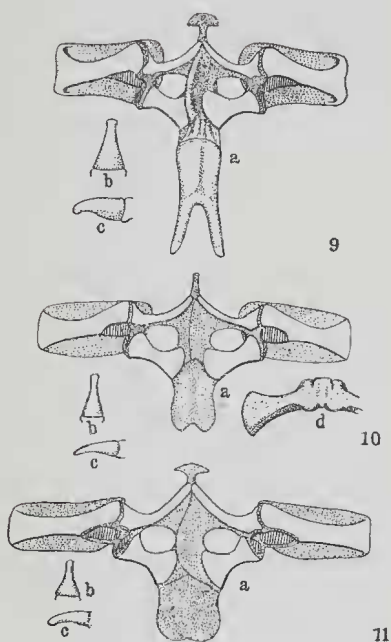
The two specimens in Mr. Woodward's collection are from the Margaret River. They are the hosts of a great number of the maggot larvae of some Dipterous insect, probably *Batrachomyia*.² Each of these maggots causes a gall-like swelling of considerable size and a frog so infested presents a remarkable sight.

Mr. Fletcher³ has suggested that "if the generic definition of *Helioporus* be amended in respect to the tympanum" his genus *Philocryphus* might be regarded as synonymous with it. He also notes the very different form of the sternum but apparently did not value it as a generic character. The widely different nature of the sterna of these two species (Text-Figs. 9a and 10a) seems to me to justify their generic separation, and with such a tangible external character as a distinct tympanum, as opposed to a hidden one in *Helioporus*, Mr. Fletcher's genus appears to be very well founded. The chief differences in the sternal apparatus lie in the sternal plate itself. In *Philocryphus* (Text Fig. 9a) it is a densely calcified plate with a slight median ventral ridge; it is produced backwards into two cylindrical, diverging, bony horns nearly as long as the sternal

¹ Barbour—Proc. Biol. Soc. Wash., XXIII, 1910, p. 89, pl. 1.

² Skuse—Proc. Linn. Soc., N.S.W., (2), IV, p. 172.

³ Fletcher—Proc. Linn. Soc., N.S.W., XXII., 1897 (1898), p. 678.



TEXT FIGS. 9, 10 and 11.

Text fig. 9.—*Philocryphus flavoguttatus*, Fletcher.Text fig. 10.—*Heliophorus albopunctatus*, Gray.Text fig. 11.—*Heliophorus pictus*, Ptrs.

- a. Ventral view of sternal apparatus.
- b. Dorsal view of terminal phalanx of fourth toe.
- c. Lateral view of same.
- d. Dorsal view of sacral vertebra.

plate, and separated from one another at their tips by a distance equal to their length. In *Heliophorus albopunctatus* (Text Fig. 10a), the sternum is a weak, semi-ossified plate, slightly nicked posteriorly; the ossification is confined to two longitudinal tracts one each side of the median line. In *Philocryphus* the free edge of the left or ventral-most epicoracoid cartilage is slightly calcified and considerably thickened; it forms a prominent ridge for the attachment of the anterior section of the pectoralis major muscle. No such ridge is discernible on the epicoracoid of *H. albopunctatus*, nor do the two epicoracoids overlap to nearly the same extent as in *Philocryphus*. Another difference is apparent in the shape of the omosternum. In *H. albopunctatus*, it is a simple narrow band of cartilage, while in *Philocryphus* it is expanded anteriorly into a semi-circular plate. The omosternum, however, shows considerable variation in this (see Text Fig. 11a, *H. pictus*)

and other Cystignathoid genera, notably *Limnodynastes*, so that only specific importance can be attached to it. In *H. pictus*, it bears a much closer resemblance to that of *Philocryphus* than does *H. albopunctatus*. *Philocryphus* is a much larger and stouter form than its western ally, and has much more powerful arms. In correlation with this development we find the strongly calcified sternum with its ventral ridge, and the downturned thickened edge of the left epicoracoidal cartilage; the pectoral muscles which find attachment at these ridges are the largest I have observed in any Australian frog.

The sternal apparatus of *H. pictus* (Text fig. 11a) differs from that of *H. albopunctatus* in minor points only. The most important difference is the broader sternal plate which shows no sign of ossification. The omosternum is expanded anteriorly and is not unlike that of *Philocryphus*.

The two genera may be characterised as follows:—

HELIOPORUS, Gray.

Pupil erect. Tongue subcircular, slightly nicked behind. Vomerine teeth between the choanae. Tympanum concealed. Toes sometimes as much as half-webbed. Outer metatarsals united. Omosternum cartilaginous; sternum a cartilaginous or semi-ossified plate, nicked behind. Sacral vertebra dilated. Terminal phalanges stout, simple.

PHILOCRYPHUS, Fletcher.

Pupil erect. Tongue subcircular, slightly nicked behind. Vomerine teeth between the choanae. Tympanum quite distinct. Toes with a thick basal web. Outer metatarsals united. Omosternum cartilaginous; sternum a strongly calcified plate with a slight median ventral ridge and two strong xyphisternal horns. Sacral vertebra dilated. Terminal phalanges moderate, simple.

MYOBATRACHUS GOULDII, Gray.

Myobatrachus gouldii, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 329.
 " " Fletcher, Proc. Linn. Soc. N.S.W., XXII, 1897 (1898),
 pp. 680 and 681.

I have examined four specimens of this species and find that they differ in several points from Dr. Boulenger's description. The

pupil is in every case horizontal, and the tympanum is hidden. The under surfaces are coarsely wrinkled, and although not granular, could hardly be described as smooth. An examination of further specimens will be necessary to decide whether this condition is natural.

Localities.—Two specimens are in the collection. In the Australian Museum are two specimens taken by Mr. H. Richards at the Harvey, eighty miles south of Perth.

HYLA CAERULEA, White.

- Hyla caerulea*, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 383.
 " " Fischer, Zool. Gart., XXIV., 1883, pp. 21 and 55 (habits).
 " " Fletcher, Proc. Linn. Soc. N.S.W., XXII, 1897 (1898), pp. 669 and 681-2.
 " " Garman, Bull. Mus. Comp. Zool., XXXIX, 1901, p. 14 (note only).
 " " Boulenger, Zool. Jahrb., Supplm., XV., Bd. I, 1912, p. 211.
 " *irrorata*, de Vis, Proc. Roy. Soc. Q'land., I., p. 128.
 " " Boulenger, Ann. Mag. Nat. Hist. (5). XVI., 1885, p. 387 (= *H. infrafronata* ?)
 " " Fry, Rec. Austr. Mus., IX, 1912, p. 100 (= *caerulea*).

Locality.—A single specimen is in the collection from Napier Broome Bay.

HYLA RUBELLA, Gray.

- Hyla rubella*, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 405.
 " " Spencer, Rept. "Horn" Sci. Expdn., II, 1896, p. 170, pl. XV., figs. 26-28.
 " " Fletcher, Proc. Linn. Soc. N.S.W., XXII., 1897 (1898), p. 669.

Locality.—A single specimen from Napier Broome Bay.

HYLA ADELAIIDENSIS, Gray.

- Hyla adelaidensis*, Boulenger, Brit. Mus. Cat. Batr., 2nd ed, 1882, p. 408.
 " " Fletcher, Proc. Linn. Soc., N.S.W., XXII., 1897 (1898), p. 681.

Locality.—Several specimens are in the collection from Harvey.

HYLA LATOPALMATA, Günther.

- Hyla latopalmata*, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 414, pl. XXVI., fig. 4.
 " " Fletcher, Proc. Linn. Soc., N.S.W., XXII., 1897 (1898) pp. 681-2.
 " " Fry, Rec. Austr. Mus., X., p. 20, pl. I and Fig. 12.

Locality.—Four specimens from Napier Broome Bay.

HYLA NASUTA, Gray.

- Hyla nasuta*, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 415.
" " Fletcher, Proc. Linn. Soc. N.S.W., XXII, 1897 (1898), p. 682.
" " Kampen, Nova Guinea, V., 1909, p. 35.
" *peninsulae*, de Vis, Proc. Roy. Soc. Q'land., I, 1884, p. 129.
" " Boulenger, Zool. Rec., 1885, Rept., p. 24 (= *nasuta*.)
? " *semoni*, Böttger, in Semon's Zool. Forsch., V., 1894, p. 112, pl. V, fig. 1.

Locality.—Three specimens from Napier Broome Bay. Collected by Mr. G. F. Hill. This species has not been previously recorded from Western Australia.
